

STUDY TYPE: Adsorption and Desorption

GUIDELINE: OCSPP

PC CODE: 101103

TEST MATERIAL [Triazinyl-6-¹⁴C]-CGA-215525-OH; Lot No.: CL-XLVII-35; Radiochemical Purity: 94.5% on 7/7/99 and 92.3% on 7/15/99; Chemical purity: 82.3% on 7/15/99; Specific Activity: 35µCi/mg

CITATION:

STUDY DIRECTOR: Kay Sparrow

TITLE: Soil adsorption and desorption of [Triazinyl-6-¹⁴C]-CGA-215525-OH by Batch Equilibrium Method

STUDY REPORT DATE: May 5, 2000

TESTING FACILITY: Novartis Crop Protection, Inc.
Environmental Safety Department
410 Swing Road P.O. Box 18300 Greensboro, NC 27419

SPONSOR: Novartis Crop Protection, Inc.

CLASSIFICATION: This study is classified as **Supplemental**. This study is scientifically valid, though information on the soil mobility (batch equilibrium) of pymetrozine degradate CGA-215525-OH could not be assessed due to instability of the test compound. Biodegradation can be shown by repeating the experiment with a sterilized sample of the soil. If no plateau is achieved even in this case, the experimenter should search for other phenomena that could be involved. This could be done with appropriate modifications of the experimental conditions (temperature, shaking times, soil/solution ratios).

EPA REVIEWER

Jessica Joyce Signature: _____
ERB3, EFED Date: _____

Rochelle F.H. Bohaty, Senior Scientist
U.S. EPA Date:

ABSTRACT

This study does not provide useful information on the soil mobility (batch equilibrium) of the pymetrozine degradate CGA-215525-OH because the test compound was unstable under test conditions. A definitive adsorption/desorption study could not be performed and a valid mobility assessment was not possible using viable soils.

The mobility of triazine ring-labeled [6-¹⁴C]CGA-215525-OH, at a nominal concentration of 5.84 µg/mL, could not be determined due to the instability of the compound in each of the four soil:solution slurries studied. Data from a preliminary study indicated that the test compound was unstable during a 2-hour equilibration period. Due to the instability of the parent compound in the soil:0.01 M CaCl₂ test systems, a definitive adsorption/desorption study could not be performed and the adsorption and desorption coefficients could not be calculated.

METHODOLOGY

For the preliminary (Range-Finding) investigations; one replicate of each soil type was prepared for extraction validation. 5 mL of 80:20 acetonitrile:water were added to 2 g (weight weight) of soil. The samples were shaken on the horizontal shaker for about 15 minutes then centrifuged for 10 minutes. The extraction procedure was repeated a second time. The combined supernatant was radioassayed and analyzed by 2D TLC. One replicate of one soil type was analyzed by HPLC. The extraction solvent for the second extraction validation was 80:20 acetonitrile: 0.5M NH₄OH (aq). Adsorption of the applied radioactivity to the test tubes was not observed (p. 24; Table II, p. 29).

For the adsorption equilibrium time experiment, the dose solution was prepared at 5.84 ppm, homogenized, and an aliquot was analyzed by HPLC. Thirteen samples were prepared for dosing. 4 mL of the dose solution were added to 2 grams (wet weight) of soil. Samples were capped, vortexed, and placed on a horizontal shaker at 25 ± 1°C. All thirteen samples were removed from the shaker at 4, 6, and 27 hours. The samples were centrifuged at approximately 2,500 rpm for 10 minutes. Triplicate aliquots of the supernatant were analyzed by LSC to determine the concentration of radioactivity in solution. One replicate per soil type was also analyzed by HPLC at each time point. The remaining soil residue was placed under a gentle stream of nitrogen to dry for combustion. The dry soil residue was homogenized and aliquots of the residue were combusted for carbon dioxide analysis. The resulting ¹⁴CO₂ was trapped in Oxosol and analyzed by LSC.

Solvent System I: Ethyl Acetate:n-propanol:water:formic acid (23N), 65:25:4 (v:v)

Solvent System II: Chloroform:methanol:ammonium hydroxide (14.8):water, 80:30:4:2, (v:v)

Limit of detection for the radioassays: 0.0003 µg, HPLC: 0.0003 µg, and Combustions: 0.0005 µg.

Results/Discussion

The average percent radioactivity found in the adsorption solution continued to decrease for all soils tested, indicating that the test system did not reach equilibrium. The study author suggests that the failure of the test material to reach equilibrium is likely related to the rapid degradation of CGA-215525-OH. The transformation product was not stable in the 0.1 M CaCl₂ test system studies, even at the 4-hour interval. Therefore, a definitive adsorption/desorption phase could not be performed and

coefficients could not be derived. The test soils contained viable microbial populations within the matrix. The estimated solubility of CGA-215525-OH in water was determined to be >0.12 mg/mL.

Method Deficiencies and Reviewer's Comments

1. The study author makes note that based on the instability of the degradate, that CGA-215525-OH would not be expected to persist in aerobic soil: water environments.
2. CGA-215525-OH is soluble at >0.12 mg/mL in water.